CHAPTER 2. STATE OVERVIEW

A. Geographic Context

1. Geography:

Louisiana is located in the south-central United States at the terminus of the Mississippi River. Alexandria, Baton Rouge, Lafayette, Lake Charles, Monroe, New Orleans, and Shreveport are its major cities.

The physiographic features of the state include pine hills, alluvial plains, coastal marshes, prairies, and bluffs. Natural elevations range from below sea level along the coastal zone to 535 feet in the northern uplands. Land cover in the northwestern and western part of the state consists mostly of upland, mixed evergreen/deciduous forests. The northeast and south-central part of the state is mainly agriculture-cropland-grassland, with some remnant forests consisting of highly fragmented bottomland hardwoods. The upper portion of the southeastern part of the state, known as the Florida Parishes, consists primarily of upland forest dominated by evergreen/mixed hardwoods, agriculture-cropland-grassland areas with some upland scrub-shrub, and longleaf pine flatwoods. The lower southeastern portion is made up mainly of water, marsh areas ranging from fresh to saline, and bottomland hardwoods. The southwestern part of the state is dominated by agriculture-cropland-grassland and upland or wetland scrub-shrub vegetation. The coastal portion of the state is made up mostly of fresh, intermediate, brackish, and saline marshes and, increasingly, open water (Hartley et al. 2000).

Presently, nearly all of coastal Louisiana is retreating before the advance of the Gulf of Mexico due to the containment of the Mississippi River for navigation and flood control, and other factors. The Mississippi and Atchafalaya river deltas are the only coastal areas with significant sediment accretion and delta formation. The floodplain of the Atchafalaya River, the largest distributary of the Mississippi River, holds the best known example of forested wetlands in Louisiana and the largest remaining hardwood swamp in the country.

2. Geology:

Geologically, most of Louisiana’s surface area consist of Quaternary sediment. Holocene alluvial sediments deposited by the Mississippi, Red, Ouachita, and other rivers constitute 55% of the surface area, 25% of the state's surface is occupied by deposits associated with Pleistocene terraces, and the final 20% comprises strata of Tertiary age, principally on the Sabine uplift (which lies in the northwest portion of the state), and in the north Louisiana salt-dome basin. Within this area, Cretaceous rocks are present in a few small exposures on the tops of salt domes that have surface expression along with wind-blown loess deposits.

During glacial episodes in the Quaternary, sea levels dropped and shorelines moved seaward. As a result, rivers flowing into the Gulf of Mexico would deposit their sediments farther out and outwash deposits of sand, gravel, and silt, known as valley trains, were deposited in the lower Mississippi valley. Remnants of valley trains deposited in the late Pleistocene can be found along the western edge of the Mississippi River flood plain in northeastern Louisiana. Areas adjacent to the Mississippi River valley were covered by loess, a wind-blown silt derived from glacial outwash deposits. Loess deposits up to several meters thick remain preserved in areas flanking the valley.

3. Coastal Zone:

Louisiana has over 3 million acres of coastal wetlands which constitute about 30% of the remaining coastal marsh in the lower 48 states. Louisiana's coastal zone can be divided into two distinct regions: the Chenier Plain, extending west from Vermilion Bay, Louisiana, into Texas; and the Deltaic Plain, from Vermilion Bay east to the Pearl River Basin on the Mississippi state line. Both areas were formed by historic patterns of sedimentation and erosion from the Mississippi River and its distributaries along with influences from the Gulf of Mexico. Over the past several thousand years, these deltaic processes created more than four million acres of coastal wetlands and gave rise to one of the most productive ecosystems on Earth. The Chenier Plain contains highly productive inland lakes and wetlands behind oak-covered remnant beach ridges (cheniers) that parallel the coast. The Deltaic Plain is characterized by a vast system of low-lying wetlands and coastal barrier islands (Benoit 1997). These wetland ecosystems are of national significance in terms of their ability to support substantial commercial and recreational freshwater and marine fisheries. They also serve as a haven for fur-bearing animals, shorebirds, waterbirds, overwintering waterfowl, and migrating Neotropical songbirds.

Coastal Louisiana has one of the highest land loss rates in the United States. Thirty-five to 40 sq miles of coastal wetlands are estimated to have disappeared annually over the last 30 years, accounting for 90% of coastal marsh loss nationwide. Annual losses were estimated by the U.S. Army Corps of Engineers (COE) to be 40-50 sq miles during the late 1980's (Benoit 1997, Johnston et al. 1995). Since the 1930s, coastal Louisiana has lost over 1.2 million acres of land. It was estimated in 2000 that coastal Louisiana would experience an additional loss of 431,000 acres by 2050 (Fig. 2.1). Historic hydromodification of the Mississippi River, dredging canals for oil and gas exploration and pipeline installation, and dredging and filling for residential and commercial development combine with natural factors, such as hurricanes, to produce such losses (Benoit 1997). Additionally, sea level rise, land subsidence, and erosion of barrier islands, which leave the leeward areas less adequately buffered from wind and tidal influences, contribute to coastal wetland loss by converting coastal wetlands to open water areas. The extraction and transport of crude oil, natural gas, and other minerals from state lands and waters, and from the federally-controlled Outer Continental Shelf have required the development of an extensive network of access canals, pipelines, and drilling sites. These activities have contributed greatly to land loss and to ecosystem alterations from ensuing saltwater intrusion (Benoit 1997).

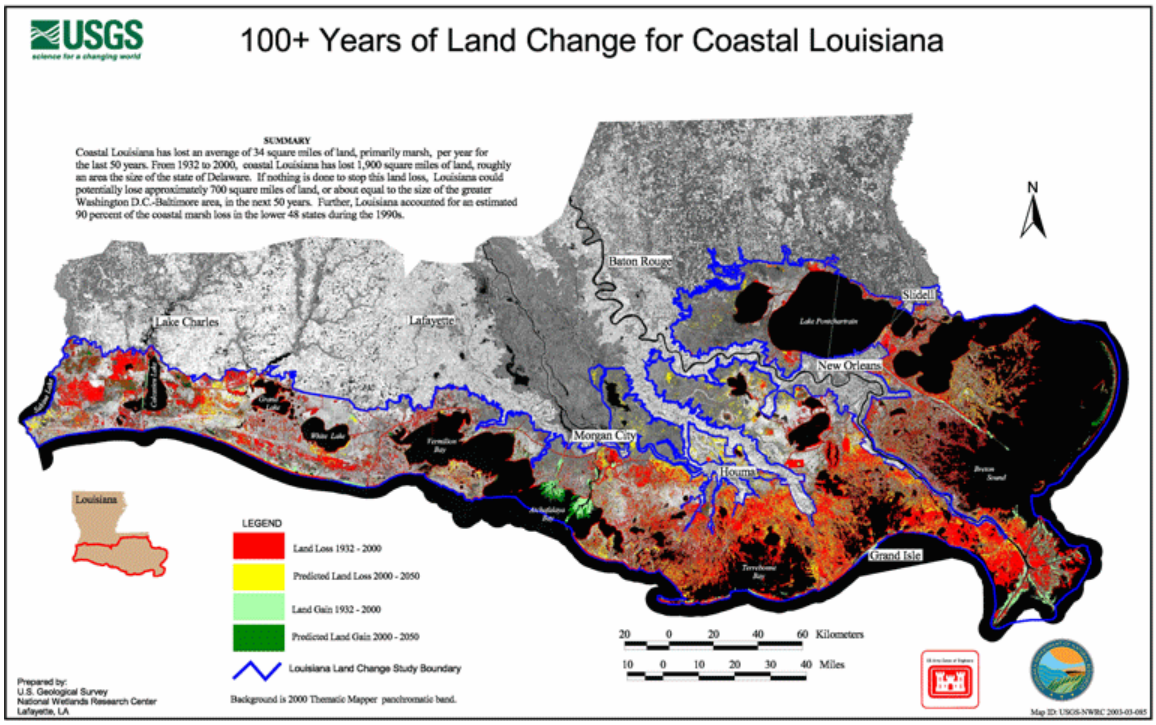

Figure 2.1. Historical and projected land loss for coastal Louisiana.

4. Coastal Zone Facts:

Historical Land Loss in Coastal Louisiana - Louisiana has lost 1,900 square miles of land since the 1930's (Barras et al. 1994, Barras et al. 2003, Dunbar et al. 1992). Currently Louisiana has 30% of the total coastal marsh and accounts for 90% of the coastal marsh loss in the lower 48 states (Dahl 2000, Field et al. 1991, USGS 2005).

Current Rate of Coastal Land Loss - Between 1990 and 2000, wetland loss was approximately 24 square miles per year- that is the equivalent of approximately one football field lost every 38 minutes. The projected loss over the next 50 years, with current restoration efforts taken into account, is estimated to be approximately 500 square miles (Barras et al. 2003).

Population Living in the Coastal Parishes - In 2000, over 2 million residents- more than 50% of the state's population according to U.S. Census Bureau (USCB) estimates- lived in Louisiana's coastal parishes (USCB 2002).

Louisiana Energy Facts - Among the 50 states, the following are some statistics for Louisiana's Primary Energy Production for 2003 (LDNR 2004). Although production is statewide, much comes from the coastal parishes.

	Crude Oil	**Natural Gas**
Including Outer Continental Shelf Production	Ranks 1st	Ranks 2nd
Excluding Outer Continental Shelf Production	Ranks 4th	Ranks 5th

Waterborne Commerce - Louisiana coastal wetlands provide storm protection for ports that carry nearly 500 million tons of waterborne commerce annually, which accounts for 21% of all waterborne commerce in the United States each year. Four of the top ten largest ports in the United States are located in Louisiana (COE 2002).

Commercial Fishing - In 2002, Louisiana commercial landings exceeded 1 billion pounds with a dockside value of $343 million, that accounts for approximately 30% of the total catch by weight in the lower 48 States (USDC 2002).

Fur Harvest - Trapping in Louisiana coastal wetlands generates approximately $2 million annually (LDWF 2004a).

Alligator Harvest - The Louisiana alligator harvest is valued at approximately $30 million annually (LDWF 2003).

Waterfowl - Louisiana's coastal wetlands provide habitat for over 5 million migratory waterfowl (LDWF 2000).

Coastal Restoration Projects (1986-2004) - 467 projects have been constructed

State-funded projects - 39 projects constructed
Breaux Act projects - 71 projects constructed
Parish Coastal Wetlands Restoration Program (Christmas Tree Program) - 35 projects constructed
Other federally-assisted projects - 31 projects constructed
Vegetation Planting Program - 291 project sites

Other Coastal Restoration Efforts

Breaux Act Projects - 61 additional projects have been approved and are currently in the design phase.
Louisiana Coastal Area Comprehensive Coastwide Ecosystem Restoration Study (LCA) - The goal of the LCA Study is to gain a federal and state commitment to a large-scale ecosystem restoration program in coastal Louisiana (www.lca.gov).
America's Wetland Campaign - The campaign was established in 2002 to increase national and world awareness of issues associated with Louisiana's coastal wetland loss (www.americaswetland.com).

Note: The above listed coastal zone facts change regularly and are only current as of 07/13/2005.

5. Climate:

The climate in Louisiana is relatively mild due to the subtropical influence of the Gulf of Mexico and cooler, drier air from the central plains. Summers tend to be hot and humid and winters are mild. Monthly temperatures range from an average high of 93.3 F in the summer to an average low of 36.2 F in the winter. Average yearly precipitation ranges from 66 inches in the southeast to 48 inches in the northwest. The growing season is roughly 220 days in length. Louisiana is impacted by tropical weather disturbances with an average frequency of one tropical storm every 1.6 years, one hurricane every 3.3 years, and a major hurricane every 14 years (Roth 1998).

B. Land Ownership and Population Trends

1. Land Ownership:

The state of Louisiana covers 31.4 million acres, of which 3.8 million acres are

covered by water (NRCS 2000). Roughly 7% is in federal or state ownership and 93% is privately owned (Hartley et al. 2000). The high degree of private land ownership highlights the vital role private landowners can play in the conservation of the state's wildlife and fisheries resources.

Louisiana's forestlands cover 48% (13.2 million acres) of the state's land area (NRCS 2000). Private, non-industrial landowners own 62% of the state's forestland, forest-product industries own 29%, and the remaining 9% is in state or federal ownership (LDAF 2004). Agriculture lands cover 42% (11.5 million acres) of the state's land area with 73% (8.4 million acres) classified as actual crop, pasture or rangelands, 26% (3.0 million acres) classified as other rural lands and 1% (250,007 acres) classified as Conservation Reserve Program (CRP) land (NRCS 2000, 2005).

2. Population Trends:

According to the USCB (2000), Louisiana experienced a 5.9% increase in its population from 1990 to 2000. Much of this increase stems from urbanization of cities and is not reflective of an overall parish-wide population increase. Areas of the state that experienced some of the greatest increases due to residential development include Ascension, Livingston, St. Tammany, and Tangipahoa parishes, which together comprise a large portion of the East Gulf Coast Plain Ecoregion. In contrast, many parishes in the Upper West Gulf Coast Plain and the upper portion of the Mississippi River Alluvial Plain show decreasing population trends (Fig. 2.2). Habitat fragmentation, degradation,

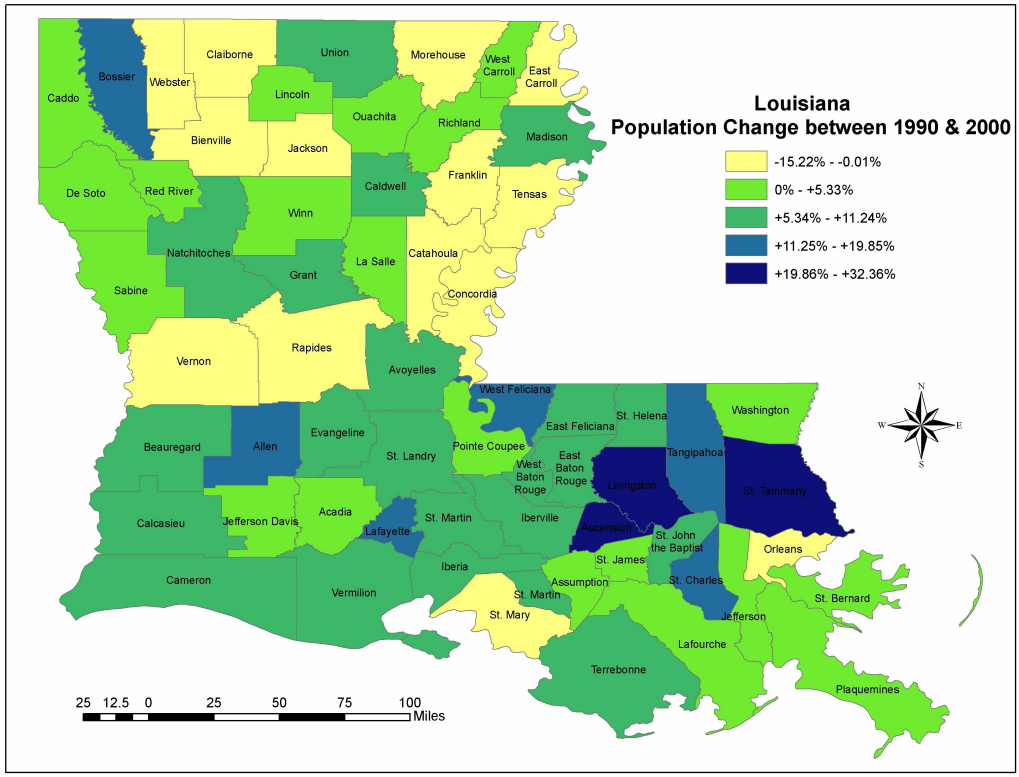

Figure 2.2. Louisiana's population trends by parish between 1990 and 2000.

and loss due to the continued increase in the population growth and associated development throughout Louisiana are some of the greatest threats to the state's wildlife and fisheries species. However, in areas which are experiencing population declines, the potential for habitat improvements for many of Louisiana's wildlife and fish species should be greater.

C. Recent Trends in Consumptive and Non-consumptive Recreational Use in Louisiana

Sportspersons and wildlife watchers across the United States spend $110 billion annually, 1.1 percent of the Nation's gross domestic product. In the southeastern region of the country, 19 percent of the population identify themselves as anglers, 9 percent are hunters, and 25 percent of the population participates in wildlife viewing activities (USDI et al. 2003).

Data provided by the latest National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (USDI et al. 2003) show that for the year 2001, 1.6 million people participated in fishing, hunting, and wildlife-watching activities in Louisiana. These activities resulted in roughly $1.6 billion in expenditures with the majority spent on equipment (58%) and trip-related (36%) expenses. A total of 970,000 sportspersons participated in fishing and 12.1 million recreational fishing trips were made. Total expenditures were $703 million with 57% trip-related, 39% for equipment, and 5% for other expenses. A total of 333,000 sportspersons participated in hunting and 6.3 million hunting trips were made. Total hunting expenditures were $446 million with 61% spent on equipment, 27% trip-related, and 12% for other expenses. A total of 935,000 people participated in wildlife-watching activities and 2.4 million trips were made. Total expenditures were $168 million with 58% spent on equipment, 33% trip-related and 9% for other expenses.

D. Ecological Regions and Aquatic Drainage Basins in the State

1. Terrestrial Systems:

Louisiana contains a highly diverse ecological landscape and the physiographic distribution of species often corresponds to ecological boundaries. Areas which share similar ecological attributes such as vegetation, soils, geology, climate, hydrology, and wildlife can be classified as ecoregions. Using an ecoregion approach to conservation planning will allow LDWF to facilitate the implementation of the CWCS by identifying research and information needs, assessing environmental resources, determining regional conservation goals, and maximizing to the extent possible the limited agency resources currently available for species of conservation concern. For terrestrial species and habitats this strategy will follow the ecoregional habitat classification developed by The Nature Conservancy (TNC), which is adapted from Bailey (1995) and modified by the LNHP (Fig. 2.3).

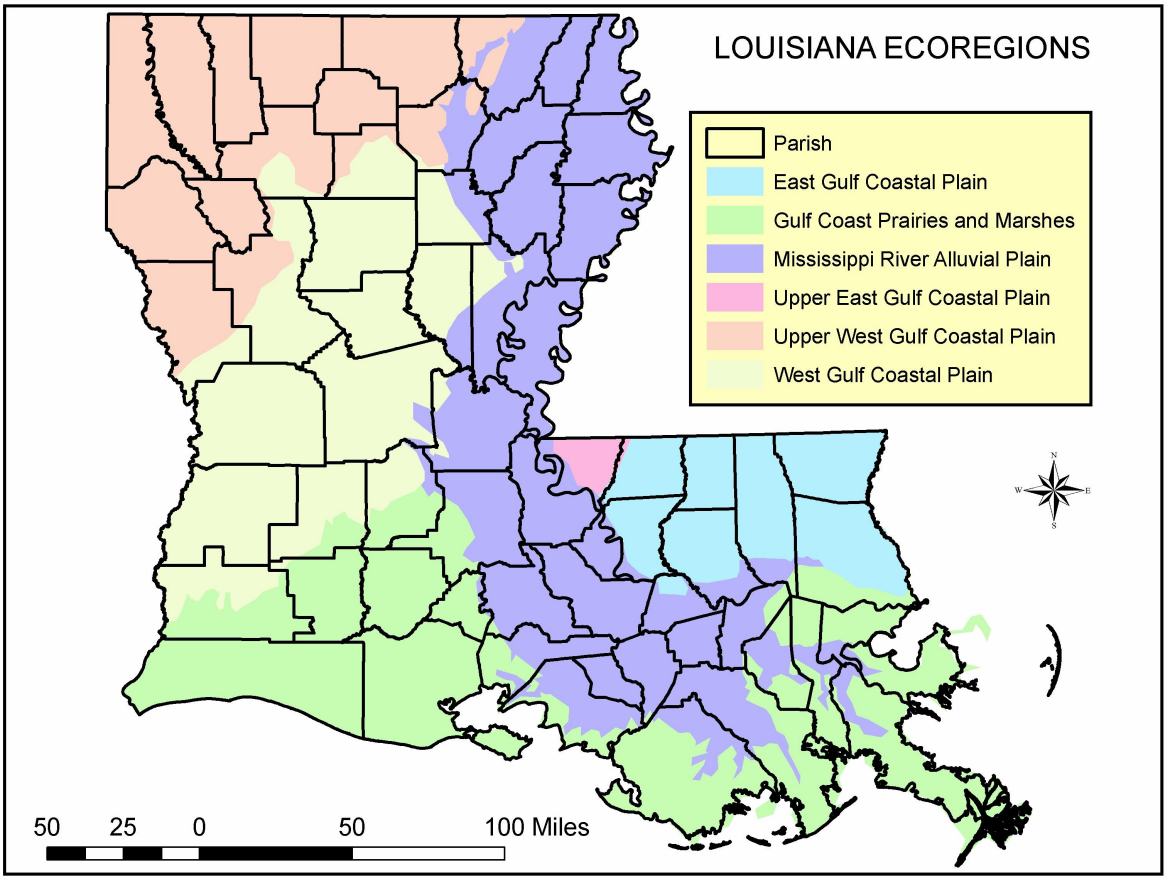

Figure 2.3. Ecoregions of Louisiana.

a. East Gulf Coastal Plain

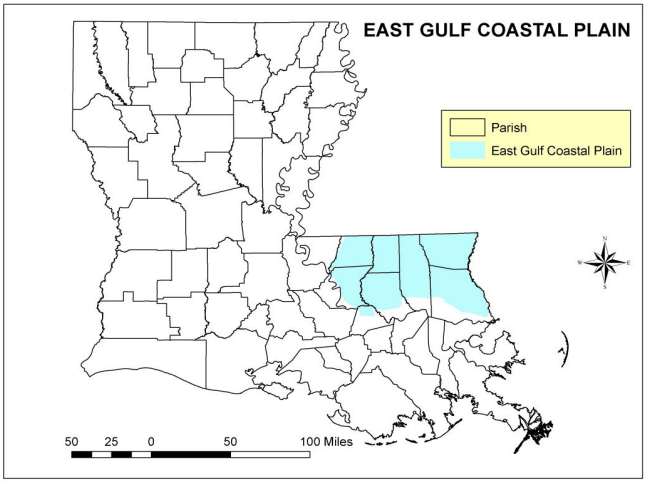

Figure 2.4. East Gulf Coastal Plain Ecoregion.

The East Gulf Coastal Plain (EGCP) ecoregion extends from southwestern Georgia across western Florida, southern Alabama, and Mississippi, and into the Florida Parishes of Louisiana. It occurs in all or parts of East Feliciana, East Baton Rouge, Ascension, Livingston, St. Helena, Tangipahoa, St. Tammany, and Washington Parishes (Fig. 2.4). There is a transition of natural community types across this ecoregion. The western parishes of East Baton Rouge, Livingston, and Ascension contain influences from the Mississippi River Alluvial Plain with some Bottomland Hardwood Forests. Also in these three parishes are the Spruce Pine – Hardwood Flatwoods that appear to be a transition type between the bottomland forests and longleaf

pine savannahs (Smith 1996). Eastern Longleaf Pine Savannahs, along with the Live Oak – Pine – Magnolia Forests, were once one of the predominant natural community types in the southeastern Florida Parishes. Also found in the EGCP are the Eastern Upland Longleaf Pine Forests, Eastern Hillside Seepage Bogs, and Slash Pine – Pondcypress – Hardwood Forests. Cypress Swamps, Small Stream Forests, and Bayhead Swamps occur throughout the ecoregion. Table 2.1 lists all of the habitats within the ecoregion and the number of species of conservation concern occurring within each habitat.

Table 2.1. Habitats and associated terrestrial species of conservation concern, by taxa, found in the East Gulf Coastal Plain ecoregion.

Habitat	Amphibian	Bird	Butterfly	Mammal	Reptile	Total
Eastern Longleaf Pine Savannah	8	14	2	5	8	37
Eastern Upland Longleaf Pine Forest	4	13	1	5	10	33
Mixed Hardwood-Loblolly Pine/Hardwood Slope Forest	4	14	2	6	7	33
Shortleaf Pine/Oak-Hickory Forest	0	18	4	5	2	29
Bottomland Hardwood Forest	2	16	2	5	3	28
Small Stream Forest	2	14	3	5	2	26
Agriculture/Cropland/Grassland	0	12	6	4	0	22
Slash Pine-Pond Cypress-Hardwood Forest	7	11	0	3	1	22
Live Oak-Pine-Magnolia Forest	1	11	0	3	4	19
Bayhead Swamp/Forested Seep	2	12	1	3	0	18
Cypress-Tupelo-Blackgum Swamp	1	10	1	4	1	17
Spruce Pine-Hardwood Flatwood	3	3	1	4	2	13
Eastern Hillside Seepage Bog	2	3	1	2	0	8

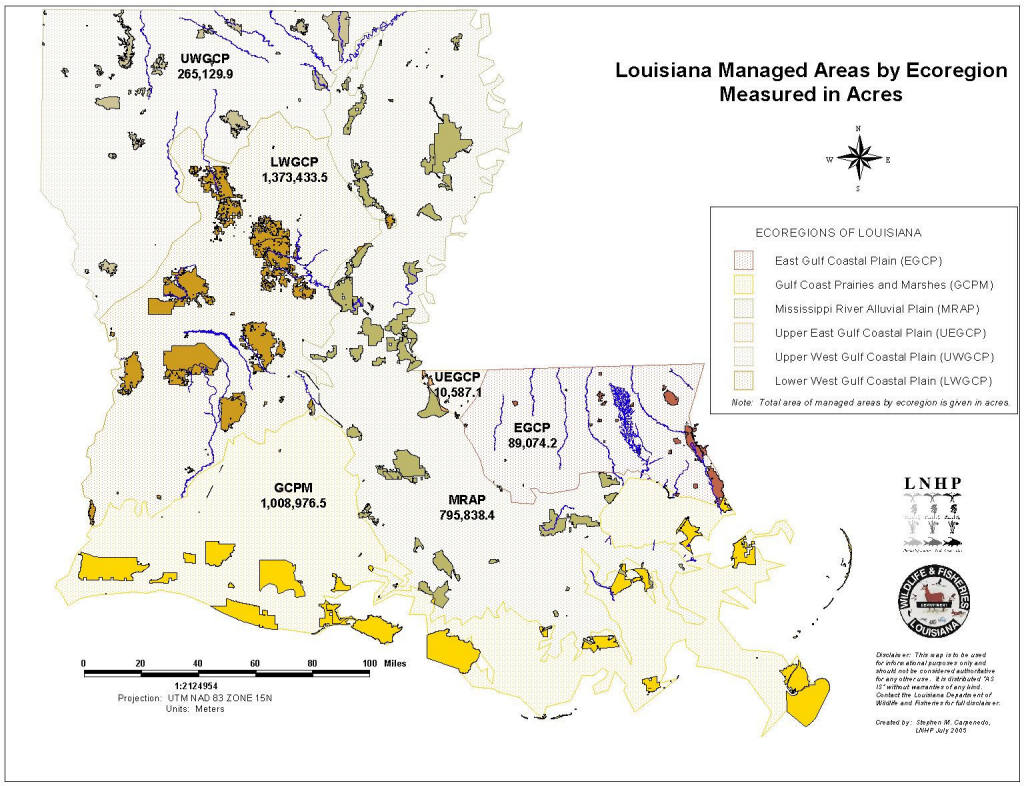

Figure 2.5. Managed areas and scenic streams in Louisiana.

Managed areas within Louisiana comprise 3.5 million acres and are found in all ecoregions of the state (Fig.2.5, Appendix A). In the EGCP, federal lands include Camp Villere National Guard Base, Bogue Chitto National Wildlife Refuge (NWR) and the northern parts of Big Branch Marsh NWR. Wildlife Management Areas include Hutchinson Creek, Sandy Hollow, Ben's Creek, Waddill, Lake Ramsey Savannah, Tangipahoa Parish School Board, and Pearl River. State parks include Tickfaw, Fairview-Riverside, and Fontainebleau. State historic sites include Port Hudson and Centenary.

As one of Louisiana's fastest growing areas, the EGCP will continue to experience the pressures of urban expansion and this poses the toughest challenge in balancing the needs of wildlife with that of humans. Population estimates from the 2000 census totaled 870,000 and is projected to increase by 8% to 945,000 in 2005 and by 15% to over 1 million by 2010 (LDED 2004).

b. Upper East Gulf Coastal Plain

The Upper East Gulf Coastal Plain (UEGCP) ecoregion includes portions of five states from western Kentucky and Tennessee down through Mississippi and Alabama and into Louisiana where a very small portion extends into West Feliciana Parish (Fig. 2.6). Within this small area of the state, Southern Mesophytic Hardwood Forest is the predominant natural community type that developed on loess hills with steep ravines and intermittent or spring-fed streams. Other associated community types include Hardwood Slope Forests and Mixed Hardwood – Loblolly Forests. Bottomland Hardwood Forests, Small Stream Forests, and Cypress Swamps also are found in low-lying areas of this ecoregion with level to gentle topography. Table 2.2 lists all of the habitats within the ecoregion addressed within the strategy along with the number of species of conservation concern occurring within these habitats. The only state-managed area is Tunica Hills WMA. State historic sites include Locust Grove and Audubon (Fig. 2.5, Appendix A).

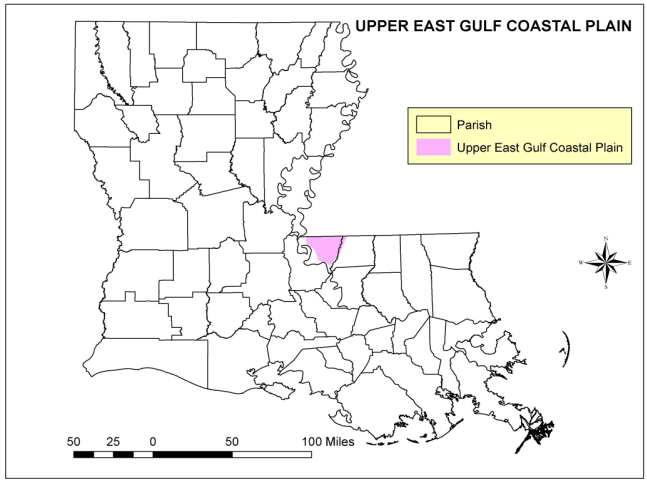

Figure 2.6. Upper East Gulf Coastal Plain Ecoregion.

Table 2.2. Habitats and associated terrestrial species of conservation concern, by taxa, found in the Upper East Gulf Coastal Plain ecoregion.

Habitat	Amphibian	Bird	Butterfly	Mammal	Reptile	Total
Southern Mesophytic Hardwood Forest	3	11	2	6	2	24
Small Stream Forest	1	14	1	5	1	22
Agriculture/Cropland/Grassland	0	14	3	3	0	20

c. Mississippi River Alluvial Plain

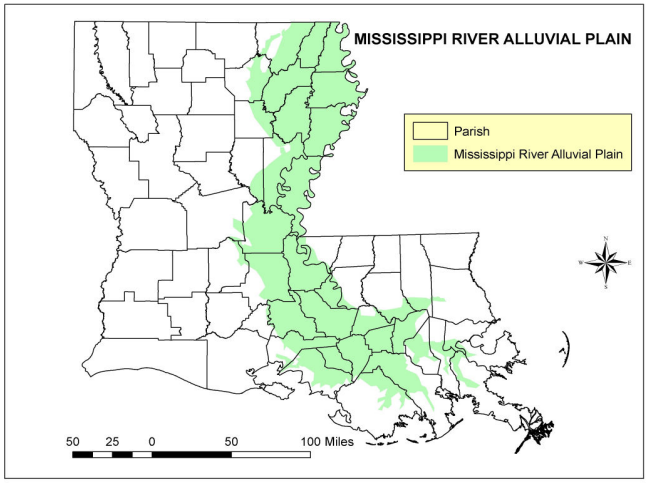

Figure 2.7. Mississippi River Alluvial Plain Ecoregion.

The Mississippi River Alluvial Plain (MRAP) ecoregion extends from the very southern tip of Illinois down through southeastern Missouri, encompasses all of eastern Arkansas, the delta region of Mississippi and into northeast Louisiana then south following the Mississippi River to where its bottomland forests meet the coastal marshes. The ecoregion includes all or portions of East Carroll, West Carroll, Morehouse, Ouachita, Richland, Madison, Franklin, Caldwell, Tensas, Catahoula, LaSalle, Concordia, Avoyelles, Rapides, Evangeline, St. Landry, Pointe Coupee, West Feliciana, West Baton Rouge, East Baton Rouge, Iberville, St. Martin, Lafayette, Iberia, St. Mary, Assumption, Terrebonne, Lafourche, St. James, Ascension, St. John the Baptist, Livingston, Tangipahoa, St. Charles, Jefferson, Orleans, Plaquemines, and St. Bernard Parishes (Fig. 2.7). The MRAP, rich in alluvial sediments, is known primarily for Bottomland Hardwood Forest natural community types as well as associated Cypress and Cypress-Tupelo Swamps. In addition, the northeastern portion of this ecoregion contains both Wet and Mesic Hardwood Flatwoods which are found on Macon Ridge. Table 2.3 lists all of the habitats within the ecoregion and the number of species of conservation concern occurring within each habitat.

Table 2.3. Habitats and associated terrestrial species of conservation concern, by taxa, found in the Mississippi River Alluvial Plain ecoregion.

Habitat	Amphibian	Bird	Butterfly	Mammal	Reptile	Total
Agriculture/Cropland/Grassland	1	24	1	4	0	30
Bottomland Hardwood Forest	2	17	1	5	2	27
Batture	0	14	0	1	2	17
Cypress-Tupelo-Blackgum Swamp	1	10	1	4	1	17
Hardwood Flatwoods	1	10	0	5	1	17
Live Oak Natural Levee Forest	0	14	0	1	1	16
Sandbars	0	3	0	0	2	5

Federal lands include Indian Bayou WMA (COE), Black Bayou Lake, Handy Break, Tensas River, Bayou Cocodrie, Catahoula Lake, Lake Ophelia, Grand Cote, Cat Island, Atchafalaya, and Bayou Teche NWRs. Wildlife Management Areas include Bayou Macon, Big Colewa Bayou, Floy McElroy, Russell Sage, Ouachita, Big Lake, Buckhorn,

Boeuf, Dewey W. Wills, Red River, Three Rivers, Grassy Lake, Spring Bayou, Pomme De Terre, Thistlethwaite, Sherburne, Joyce, Manchac, Maurepas Swamp, Attakapas Island, and Elm Hall. State parks include Chemin A Haut, Lake Bruin, Lake Fausse Point, and Cypremort Point. State historic sites include Poverty Point, Winter Quarters, Marksville, and Longfellow-Evangeline (Fig. 2.5, Appendix A).

d. Upper West Gulf Coastal Plain

The Upper West Gulf Coastal Plain (UWGCP) ecoregion extends from south-central and south-western Arkansas over to the extreme southeastern portion of Oklahoma and down into eastern Texas east to parts of northeastern Louisiana. It occurs in all or portions of Caddo, Bossier, Webster, Claiborne, Union, Morehouse, Ouachita, Lincoln, Jackson, Bienville, Natchitoches, Red River, Sabine, and DeSoto Parishes (Fig. 2.8).

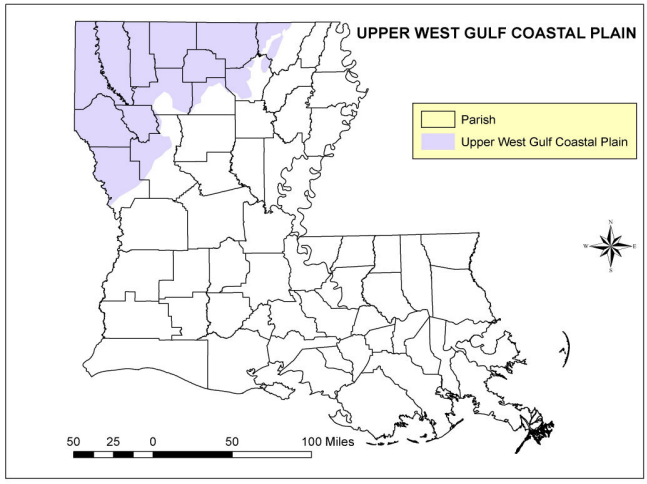

Figure 2.8. Upper West Gulf Coastal Plain Ecoregion.

The UWGCP was once recognized as the Shortleaf Pine – Oak – Hickory region of Louisiana, existing on sandy and clayey uplands above the range of longleaf pine in the West Gulf Coastal Plain (Newton, 1972). Upon settlement, the majority of the shortleaf pine was logged and has been replaced most recently by loblolly pine plantations. However, some natural stands of Shortleaf Pine - Oak - Hickory Forest still exist in this ecoregion. Western Xeric Sandhill Woodlands occur on xeric sands in the UWGCP. Hardwood Slope Forests and Mixed Hardwood - Loblolly Forests develop on more mesic conditions. Wet bottomlands include natural communities such as: Forested Seeps, Bayhead Swamps, Small Stream Forests, Bottomland Hardwood Forests, and Cypress Swamps. Table 2.4 lists all of the habitats within the ecoregion and the number of species of conservation concern occurring within each habitat.

Federal lands include the upper parts of Red River, Upper Ouachita, and D'Arbonne NWRs, the Caney Ranger District of Kisatchie National Forest (KNF), and the East Range of Barksdale Air Force Base (AFB). Wildlife Management Areas include Soda Lake, Bayou Pierre, Loggy Bayou, Jackson-Bienville, and Sabine. State Parks include Lake Claiborne, Lake D'Arbornne, Lake Bistineau, and North Toledo Bend. State historic sites include Mansfield, Los Adaes, and Fort Jessup (Fig. 2.5, Appendix A).

Table 2.4. Habitats and associated terrestrial species of conservation concern, by taxa, found in the Upper West Gulf Coastal Plain ecoregion.

Habitat	Amphibian	Bird	Butterfly	Mammal	Reptile	Total
Shortleaf Pine/Oak-Hickory Forest	2	20	6	5	4	37
Agriculture/Cropland/Grassland	2	20	6	3	1	32
Mixed Hardwood-Loblolly Pine/ Hardwood Slope Forest	2	17	5	5	3	32
Western Upland Longleaf Pine Forest	3	13	6	5	4	31
Small Stream Forest	3	15	3	6	1	28
Bottomland Hardwood Forest	4	15	1	3	3	26
Bayhead Swamp/ Forested Seep	1	12	3	3	0	19
Cypress-Tupelo-Blackgum Swamp	1	10	0	3	1	15
Western Xeric Sandhill Woodland	1	7	2	1	4	15
Hardwood Flatwoods	1	9	0	3	1	14
Calcareous Prairie	0	5	3	2	1	11
Calcareous Forest	0	4	0	1	1	6
Saline Prairie	0	3	0	2	1	6

e. Lower West Gulf Coastal Plain

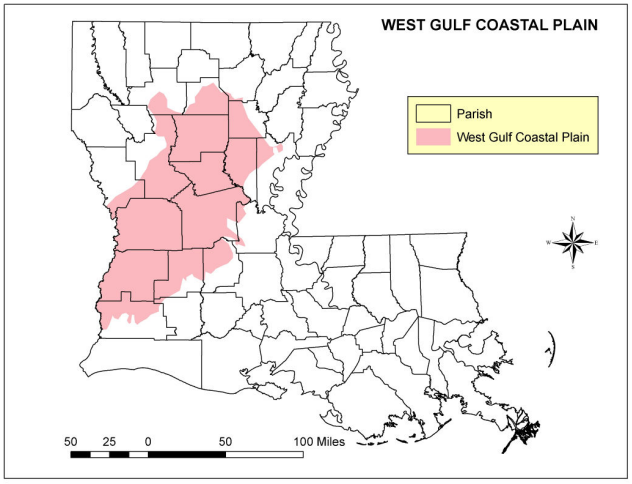

Figure 2.9. Lower West Gulf Coastal Plain Ecoregion.

The Lower West Gulf Coastal Plain (LWGCP) ecoregion occurs from central Louisiana into eastern Texas. It includes all or portions of Ouachita, Jackson, Caldwell, Catahoula, LaSalle, Rapides, Avoyelles, Evangeline, Allen, Jefferson Davis, Calcasieu, Beauregard, Vernon, Sabine, Natchitoches, Grant, Winn, and Bienville Parishes (Fig. 2.9). This ecoregion is distinguished by a wide range of natural community types but is primarily known for its longleaf pine forests. In the central portion of this ecoregion, Western Upland Longleaf Pine Forests are found in association with Hardwood Slope Forests, and Mixed Hardwood - Loblolly Forests. Forested Seeps and Western Hillside Seepage Bogs occur along slopes and at lower elevations. The LWGCP contains unique geologic formations occurring in northeast to southwest bands across the ecoregion from Caldwell to Vernon Parish. These uplifted formations, the Jackson, Catahoula, Cook Mountain, and Fleming formations, present distinctive soil types and conditions which influenced the development of natural community types along these formation bands. Depending on the formation type and degree of uplift, calcareous clays, sandstones, saline deposits, siltstones and ironstones have shaped the development of natural communities such as the Calcareous Forests, Calcareous Prairies, Saline Prairies, and Sandstone Glades/Barrens of this ecoregion. The south and southwestern portions of the LWGCP ecoregion in Louisiana are known for Western Longleaf Pine Savannahs and associated Flatwoods Ponds and Seepage Bogs. This portion of the ecoregion is the transition zone between

Louisiana's coastal prairies and upland longleaf pine forests. Table 2.5 lists all of the habitats within the ecoregion and the number of species of conservation concern occurring within each habitat.

Table 2.5. Habitats and associated terrestrial species of conservation concern, by taxa, found in the Lower West Gulf Coastal Plain ecoregion.

Habitat	Amphibian	Bird	Butterfly	Mammal	Reptile	Total
Agriculture/Cropland/Grassland	1	23	7	3	1	35
Shortleaf Pine/Oak-Hickory Forest	2	19	5	5	3	34
Mixed Hardwood-Loblolly Pine/ Hardwood Slope Forest	2	16	4	6	2	30
Western Upland Longleaf Pine Forest	3	13	5	4	3	28
Small Stream Forest	3	14	2	6	1	26
Bottomland Hardwood Forest	3	16	1	3	2	25
Western Longleaf Pine Savannah	2	16	2	2	2	24
Bayhead Swamp/ Forested Seep	1	12	2	2	0	17
Cypress-Tupelo-Blackgum Swamp	1	10	0	2	1	14
Calcareous Prairie	0	5	4	2	1	12
Western Xeric Sandhill Woodland	0	7	2	0	3	12
Calcareous Forest	0	4	0	2	1	7
Saline Prairie	0	3	0	2	1	6
Sandstone Glade/Barren	1	3	1	0	1	6
Western Hillside Seepage Bog	0	3	0	0	0	3

Federal lands include the lower portions Red River NWR and the Calcasieu, Catahoula, Kisatchie, and Winn Ranger Districts of KNF. Military lands include Fort Polk, Peason Ridge, and Camp Beauregard. Wildlife Management Areas include Boise-Vernon, Sabine Island, Walnut Hills, Marsh Bayou, Alexander State Forest, West Bay, Little River, Elbow Slough, and Sicily Island. State Parks include Caney Creek Lake, Chicot, South Toledo Bend, and Sam Houston Jones (Fig. 2.5, Appendix A).

f. Gulf Coast Prairies and Marshes

The Gulf Coast Prairies and Marshes (GCPM) ecoregion occupies the coastal zone of the Gulf of Mexico and stretches from Mexico up through Texas and into Louisiana. In Louisiana it occurs from the southwest portion of Louisiana's coastal prairie region and southwest coast, extending east along the entire coastal area to southeast Louisiana. The GCPM occurs in all or portions of Lafayette, Acadia, St. Landry, Evangeline, Allen, Jefferson Davis, Calcasieu, Cameron, Vermilion, Iberia, St. Mary, Terrebonne, La Fourche, St. Charles, St. John the Baptist, Jefferson,

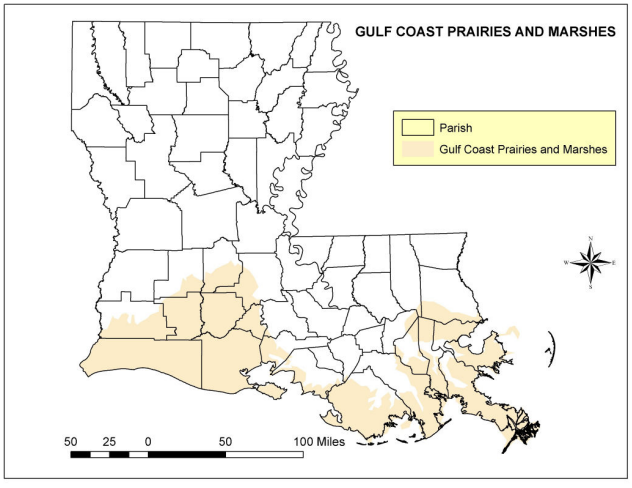

Figure 2.10. Gulf Coast Prairies and Marshes Ecoregion.

Plaquemines, St. Bernard, Orleans, St. Tammany, and Tangipahoa Parishes (Fig. 2.10).

As its name implies, this ecoregion's boundaries are defined by the coastal prairie and marsh natural community types. Louisiana's coastal prairies, once encompassing an estimated 2.5 million acres in the southwest portion of the state, now are considered critically imperiled with less than 600 acres remaining. The coastal marsh areas are comprised of salt, brackish, intermediate, and fresh marsh types across the coastal region. Associated natural communities include Cypress and Cypress-Tupelo Swamps, Coastal Live Oak-Hackberry Forests (cheniers) of the southwest coast, Live Oak Natural Levee Forests of the southeast coast, and some Bottomland Hardwood Forests. Also, the Salt Dome Hardwood Forests are unique to the south-central coast occurring on salt domes in this area. Table 2.6 lists all of the habitats within the ecoregion and the number of species of conservation concern occurring within each habitat.

Federal lands include Jean Lafitte National Historic Park and Sabine, Cameron Prairie, Lacassine, Shell Keys, Mandalay, Bayou Savage, Brenton, and Delta NWRs. Wildlife Management Areas include Rockefeller, Louisiana, Paul J. Rainey Wildlife Sanctuary, Marsh Island, Atchafalaya Delta, Terrebonne Barrier Islands, Pointe-Aux-Chenes, Salvador, Timken, Wisner, Pass-A-Loutre, and Biloxi. State Parks include Bayou Segnette, Cheniere au Tigre, Grande Isle, Palmetto Island, and St. Bernard (Fig. 2.5, Appendix A).

Table 2.6. Habitats and associated terrestrial species of conservation concern, by taxa, found in the Gulf Coast Prairies and Marshes ecoregion.

Habitat	Amphibian	Bird	Butterfly	Mammal	Reptile	Total
Brackish Marsh	0	30	5	0	1	36
Agriculture/Cropland/Grassland	1	27	5	1	1	35
Freshwater Marsh	0	27	3	0	1	31
Intermediate Marsh	0	26	5	0	0	31
Salt Marsh	0	20	5	0	1	26
Barrier Islands	0	17	2	0	6	25
Coastal Prairie	1	17	3	1	2	24
Vegetated Pioneer Emerging Delta	0	23	0	0	0	23
Bottomland Hardwood Forest	2	10	3	2	1	18
Coastal Live Oak-Hackberry Forest	0	7	2	1	2	12
Salt Dome Hardwood Forest	0	8	2	2	0	12
Coastal Dune Grassland/Shrub Thicket	0	6	2	1	2	11
Cypress-Tupelo-Blackgum Swamp	1	5	1	1	1	9
Coastal Mangrove-Marsh Shrubland	0	6	2	0	0	8
Live Oak Natural Levee Forest	0	7	0	0	0	7
Barrier Island Live Oak Forest	0	3	0	0	1	4

2. Aquatic Systems:

a. Freshwater

Louisiana's abundant bayous, rivers, lakes, reservoirs, and wetlands provide unlimited fishing, hunting, boating and recreational opportunities and are a major contributor to the state's wealth and economic growth. Today, aquatic habitats are in high demand as sources of domestic water supplies, irrigation for agriculture, and wastewater treatment. A growing proportion of Louisiana's population is beginning to appreciate the importance of our aquatic habitats as nursery areas for our commercial and sport fisheries. They are beginning to fully understand the problems of balancing biological and recreational uses with agriculture and urban needs, navigation, flood control, and waste water disposal.

Louisiana has more surface water available (84%) than any other state (XU 2004) and contains over 66,294 miles of rivers and streams, 1,078,031 acres (1,684 square miles) of lakes and reservoirs, 5,550,951 acres (9,191 square miles) of fresh and tidal wetlands and 4,899,840 acres (7,656 square miles) of estuaries (LDEQ 2004). The Mississippi River and its major tributary the Red River, along with other major river systems (Ouachita, Black, Calcasieu, Atchafalaya, Sabine, Pearl, and Mermentau), combine to incorporate more than 2,300 miles of navigable waterways.

The Mississippi drainage basin covers approximately 1.2 million square miles which represents 41% of the conterminous United States and 1/8 of North America. Combined with the Atchafalaya River basin, these two river systems are habitat for 195 species of native freshwater fish which represents almost 1/3 of the freshwater fish species in North America (Fremling et al. 1989). In addition, both river systems are habitat for over 40 species of marine fish. They also serve as conduits for the spread of invasive animal species such as the Rio Grande cichlid, Zebra mussel, and five species of Asian carp (LDWF 2004b).

A vast array of levees have been constructed for flood protection and to channelize the water flow in the rivers. Louisiana has more than 2,000 miles of levees as well as other flood control devices along these rivers. The present condition of Red and Pearl Rivers are heavily influenced by the locks and dams constructed for navigation and to control water levels. The Red River has a total of 5 lock and dam systems constructed between the Arkansas line and it's outfall at the Mississippi River. The Sabine, Pearl, Atchafalaya, and Black Rivers have all undergone alterations to their natural flow regime.

There are roughly 488 lakes, ponds, and man-made reservoirs in Louisiana. These water bodies account for nearly 1.5 million surface acres of water. The largest of these is Lake Pontchartrain with a surface acreage that covers 621 square miles and totals 397,000 acres. Toledo Bend Reservoir located on the Louisiana/Texas border is the largest man-made body of water in the South and fifth largest in surface acres in the United States. The reservoir covers 186,000 acres and has a controlled storage capacity of 4,477,000 acre-feet (1.4 trillion gallons). The reservoir was formed when the Sabine

River was impounded for hydroelectric purposes, water supply, and recreation. Many of the states lakes are small natural oxbows, which are remnants of rivers after they have altered their course.

b. Water Quality Assessments:

The Louisiana Department of Environmental Quality (LDEQ) completed sampling of all twelve of Louisiana's watershed management basins in 2002. A total of 479 water body management subsegments within the state were monitored once per month for a full year (LDEQ 2004). Designated use categories for the waters of Louisiana are: agriculture, drinking water supply, ecological significance, fish and wildlife propagation, outstanding natural resource, oyster production, and primary and secondary contact recreation. Water quality assessments for fish and wildlife propagation for the 4 major water body categories in Louisiana are listed in Table 2.7. Some of the major causes for water bodies not supporting their designated uses are: fecal coliform, dissolved oxygen, total suspended solids, turbidity, siltation, metals, pesticides, and total dissolved solids. For the water quality assessments given for each basin in Chapter 4, only the three primary designated uses recognized by LDEQ for most waters of the state are addressed. These 3 designated uses are primary contact recreation (swimming), secondary contact recreation (boating), and fish and wildlife propagation (fishing).

Table 2.7. Summary of Fish and Wildlife Propagation assessments for Louisiana's water bodies. (Reported in miles (water body count)).

	Fully Supporting	Not Supporting	Insufficient Data	Not Assessed	Total Size for Designated Use
Rivers and Streams	2,789 (95)	6,547 (248)	138 (5)	40 (6)	9,514 (354)
Lakes	78,890 (17)	586,298 (48)	0	2,284 (3)	667,472 (68)
Estuaries	3,049 (34)	1,905 (18)	0	0	4,954 (52)
Wetlands	543,360(4)	488,960 (4)	0	3,968 (2)	1,036,288 (10)

Source: Louisiana Department of Environmental Quality (2004)

c. Louisiana's Natural and Scenic Rivers:

Louisiana's Natural and Scenic River System (System) is one of the nation's largest, oldest, most diverse, and unique state river protection initiatives. It encompasses 51 streams or stream segments and is over 3,300 miles in length (Jenkins and Cascio 2000) (Fig. 2.5, Table 2.8). In the early 1970's the Louisiana Natural and Scenic River Act (Act) was passed, creating the System which sets certain requirements for a river to meet for inclusion in the program. The Act also established a regulatory component, and designated the LDWF Secretary to administer the System.

The streams and rivers included in the System are protected through a permitting process and certain prohibitions mandated by the Act. Certain activities which would

drastically alter the natural and scenic qualities of rivers in the System are prohibited. These activities include:

- Channelization
- Channel realignment
- Clearing and snagging
- Impoundment construction
- Commercial clearcutting of timber within 100 feet of the low water mark

Other activities that may have a direct, significant ecological impact on the river must be permitted by LDWF, and the permit application must also be reviewed by LDEQ, Department of Agriculture and Forestry (LDAF), Department of Culture, Recreation and Tourism (CRT), and the Office of State Planning. Activities that must be permitted include, but are not limited to:

- Bridge, pipeline and power line crossings
- Bulkheads, piers, dock and ramp construction
- Waste water discharges
- Land development adjacent to the river

Table 2.8. Area, scenic streams, and percent land use of aquatic basins in Louisiana.

		Scenic Streams		Major Land Uses (%)		
Basin	Area (miles)^2	Number of Streams	Designated Miles	Forested	Agriculture	Urban
Atchafalaya	2,374	0	0	19	15	1
Barataria	2,520	1	45	1	10	3
Calcasieu	4,270	4	566	51	26	3
Mermentau	4,786	0	0	8	57	2
Mississippi	1,886	0	0	20	18	3
Ouachita	7,644	10	751	59	29	2
Pearl	914	7	256	47	24	4
Pontchartrain	7,637	21	1,186	26	12	5
Red	7,500	5	427	54	30	3
Sabine	3,257	1	3	54	14	2
Terrebonne	3,979	0	0	11	14	2
Vermilion – Teche	4,047	1	82	16	47	4

Source: Louisiana Department of Environmental Quality (1993) and LNHP database

d. Management Basins:

Louisiana has twelve water quality management basins delineated on the basis of the natural drainage patterns of the state's major river basins (Fig. 2.11). Each water quality management basin is subdivided into stream segments in which the hydraulic and water quality characteristics are fairly constant. Land use in the basins is dominated by forestry

and agriculture although the percentage of urban use is considerable in the Pontchartrain Basin (Table 2.8). The Pearl and Pontchartrain Basins have the highest aquatic species diversity, relative to their area, in the state and, along with the Ouachita Basin, contain the highest number of species of conservation concern (Table 2.9).

Table 2.9. Aquatic basins and associated aquatic species of conservation concern listed by taxa.

Basin	Crustacean	Freshwater Fish	Mussel	Reptile	Total
Atchafalaya	0	6	0	3	9
Barataria	0	2	0	2	4
Calcasieu	3	3	3	2	11
Mermentau	2	1	0	2	5
Mississippi	1	9	1	3	14
Ouachita	2	4	16	2	24
Pearl	3	13	5	5	26
Pontchartrain	3	6	8	2	19
Red	4	9	2	2	17
Sabine	3	4	4	3	14
Terrebonne	0	1	0	2	3
Vermilion – Teche	4	1	1	2	8

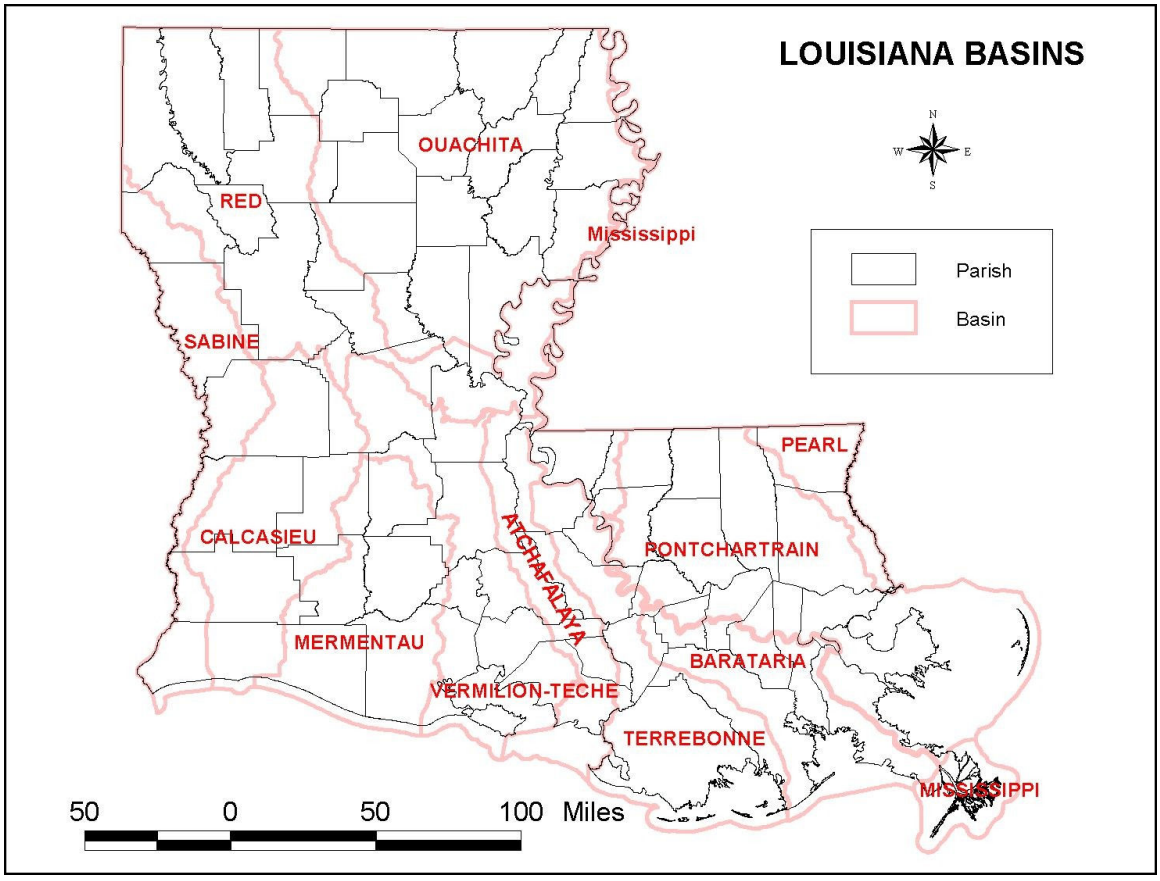

Figure 2.11. Aquatic basins in Louisiana.

1. Atchafalaya Basin

The Atchafalaya River Basin is located in south-central Louisiana. The Atchafalaya River, a distributary of the Red, Black, and Mississippi Rivers, presently carries about 30 percent of the Mississippi's flow. The basin is well-defined by a system of levees which surround it on the north, east, and west. The entire basin serves as a major floodway for the Mississippi River floodwaters. The Atchafalaya Basin is predominantly bottomland hardwoods and cypress-tupelo swamp with some freshwater marshes in the lower distributary area. It constitutes the largest contiguous freshwater swamp in the United States.

2. Barataria Basin

The Barataria Basin lies in the eastern coastal region of the state. This basin is bounded on the north and east by the lower Mississippi River, on the west by Bayou Lafourche, and on the south by the Gulf of Mexico. The major receiving waterbody in this basin is Barataria Bay. The Barataria Basin consists largely of bottomland hardwoods and fresh to brackish marshes, having some saline marsh on the fringes of Barataria Bay. Elevations in this basin range from minus two feet to four feet above sea level.

3. Calcasieu Basin

The Calcasieu River Basin is located in southwestern Louisiana and is aligned in a north-south direction. Headwaters of the Calcasieu River are in the hills west of Alexandria. The river flows south for about 160 miles to the Gulf of Mexico. The mouth of the river is about 30 miles east of the Texas – Louisiana state line. The landscape in this basin varies from pine-forested hills in the upper end to brackish and salt marshes in the lower reaches around Calcasieu Lake.

4. Mermentau Basin

The Mermentau River Basin is located in southwestern Louisiana and encompasses the prairie region of the state and a section of the coastal zone. The Mermentau River Basin is bounded on the north and east by the Vermilion – Teche River Basin, on the west by the Calcasieu River Basin, and on the south by the Gulf of Mexico. Little of the historic prairie habitat remains and the dominant habitat type is agricultural lands. Hardwood forests occur along the Mermentau and its larger tributaries. Fresh, intermediate, and brackish marshes constitute the majority of coastal wetlands with some salt marsh along the Gulf of Mexico.

5. Mississippi Basin

The upper Mississippi River forms the boundary between Louisiana and Mississippi, flowing in a southerly direction. The lower Mississippi River flows southeasterly through the southeastern section of Louisiana. The upper stretch of the Mississippi does not get any tributary flow from the Louisiana side, which is leveed. Tributaries do enter from

Mississippi, including the Yazoo, Black, Homochitto, and Buffalo Rivers and Bayou Pierre. Tributary flow is received from Thompson's Creek, Bayou Sara, and Tunica and Monte Sano Bayous between the Old River Control Structure and Baton Rouge. The river is leveed on both the east and west banks from Baton Rouge below Monte Sano Bayou to Venice. This stretch of the river is also heavily industrialized, receiving numerous industrial discharges from Baton Rouge to New Orleans. The birdfoot delta of the Mississippi, where it flows into the Gulf, consists of fresh and intermediate marshes. The habitat of the upper portion of the basin, within the levee-created batture lands, contains mostly bottomland hardwoods and a small amount of agriculture lands.

6. Ouachita Basin

The Ouachita River's source is found in the Ouachita Mountains of west-central Arkansas near the Oklahoma border. The Ouachita River flows south through northeastern Louisiana and joins with the Tensas River to form the Black River, which empties into the Red River. Most of the basin consists of rich, alluvial plains cultivated in cotton and soybeans. The northwest corner of the basin is forested in pine, which is commercially harvested.

7. Pearl Basin

The Pearl River Basin lies along the southeastern Louisiana – southwestern Mississippi border. This basin is bordered on the north by the Mississippi state line, by the Pearl River to the east, and on the west and south by the Lake Pontchartrain Basin. Elevations in the basin range from 350 feet above mean sea level in the northwest portion to sea level at the southern end. Correspondingly, the vegetation varies from pine forests and bottomland hardwoods to fresh and brackish marsh.

Seven Louisiana designated natural and scenic streams lie within the basin. The Pushepatapa Creek, Bogue Chitto River, Holmes Bayou, Bradley Slough, Wilson Slough, Morgan River, and West Pearl River are rich in species diversity. The basin is home to highest concentration of listed species of concern.

8. Pontchartrain Basin

The Lake Pontchartrain Basin, located in southeastern Louisiana, consists of the tributaries and distributaries of Lake Pontchartrain, a large estuarine lake. The basin is bounded on the north by the Mississippi state line, on the west and south by the east bank Mississippi River levee, on the east by the Pearl River Basin, and on the southeast by Breton and Chandeleur Sounds. This basin includes Lake Borgne, Breton Sound, Chandeleur Sound, and the Chandeleur Island chain. The wooded uplands in the northern part of the basin consists of both pine and hardwood forests. The southern portions of the basin consist of cypress-tupelo swamps, bottomland hardwoods, and brackish and saline marshes. The marshes of the southeastern part of the basin constitute the most-rapidly eroding area along the Louisiana coast. Elevations in this basin range from minus five feet at New Orleans to over two hundred feet near the Mississippi border.

9. Red Basin

The Red River has its origin in eastern New Mexico and flows across portions of Texas, Oklahoma, and Arkansas before entering northwestern Louisiana. The river flows southward to Shreveport, where it turns southeastward and flows for approximately 160 miles to its junction with the Atchafalaya River. From the Arkansas state line to Alexandria, the Red River is contained within high banks which range from 20 to 35 feet above low water level. Below Alexandria, the river flows through a flat alluvial plain that is subject to backwater flooding during periods of high water. The Sabine River Basin lies to the southwest of the Red River Basin, and the Ouachita River Basin lies to the east. The Calcasieu, Vermilion – Teche, and Atchafalaya River Basins lie south of the Red River Basin.

10. Sabine Basin

The Sabine River Basin lies along the Texas-Louisiana border. The basin stretches from the Texas state line near Shreveport to the Gulf of Mexico. It is bounded on the east by the Red River Basin and Calcasieu River Basin. Characteristic vegetation ranges from mixed forests in the upper basin to hardwoods in the mid-section and brackish and saline marshes in the lower end.

11. Terrebonne Basin

The Terrebonne Basin covers an area extending approximately 120 miles from the Mississippi River on the north to the Gulf of Mexico on the South. It varies in width from 18 miles to 70 miles. This basin is bounded on the west by the Atchafalaya River Basin and on the east by the Mississippi River and Bayou Lafourche. The topography of the entire basin is lowland, and all the land is subject to flooding except the natural levees along major waterways. The coastal portion of the basin is prone to tidal flooding and consists of marshes ranging from fresh to saline.

12. Vermilion – Teche Basin

The Vermilion – Teche River Basin lies in south-central Louisiana. The upper end of the basin lies in the central part of the state near Alexandria, and the basin extends southward to the Gulf of Mexico. The basin is bordered on the north and northeast by a low escarpment and the lower end of the Red River Basin. The Atchafalaya River Basin is to the east, and the Mermentau River Basin is to the west. The wooded uplands of the northern part of the basin consists of both pine and hardwood forests. The central and southern portions of the basin consist of agricultural lands and the coastal zone is a mixture of fresh, intermediate, and brackish marsh.

e. Marine

Louisiana's coastal habitats form an intergradation of habitats between upland habitats and open water marine habitats of the Gulf of Mexico. Within that gradation there are a wide variety of processes, both manmade and natural, creating an active landscape, where changes in dominant flora and fauna take place very quickly relative to many other systems. These habitats are utilized for their position on the landscape (e.g., first point of land for migrating neotropical birds), for the shelter they provide for the juvenile stages of many marine species, and as productive habitats for resident species.

Louisiana's estuarine and marine habitats are characterized by dynamic salinity regimes, riverine sedimentation patterns, and high productivity. The Mississippi River and its distributary, the Atchafalaya River are the ecological drivers of these systems, providing sediment and nutrients to coastal estuaries and fueling high productivity. Estuarine systems in southeastern Louisiana represent the remnants of five major cycles of delta building, resulting in large regressive delta formations dominated by organic sedimentation. The coastal marsh component of these estuaries is also experiencing the highest rate of wetland loss in the nation. Southwest Louisiana is dominated by fossil beach ridges with interspersed marshes. Coastal water bodies in this region are enclosed estuaries rather than the big open bays of the southeast. These estuaries are heavily impacted by human marsh management and navigational changes to the landscape. They are also extremely productive estuaries in terms of fisheries.

Marine habitats are generally seaward of the Gulf Intracoastal Waterway (GIWW) and extend out to the 3-mile limit. Louisiana's coastal zone is divided into 7 coastal study areas by LDWF's Marine Fisheries Division (Fig. 2.12).

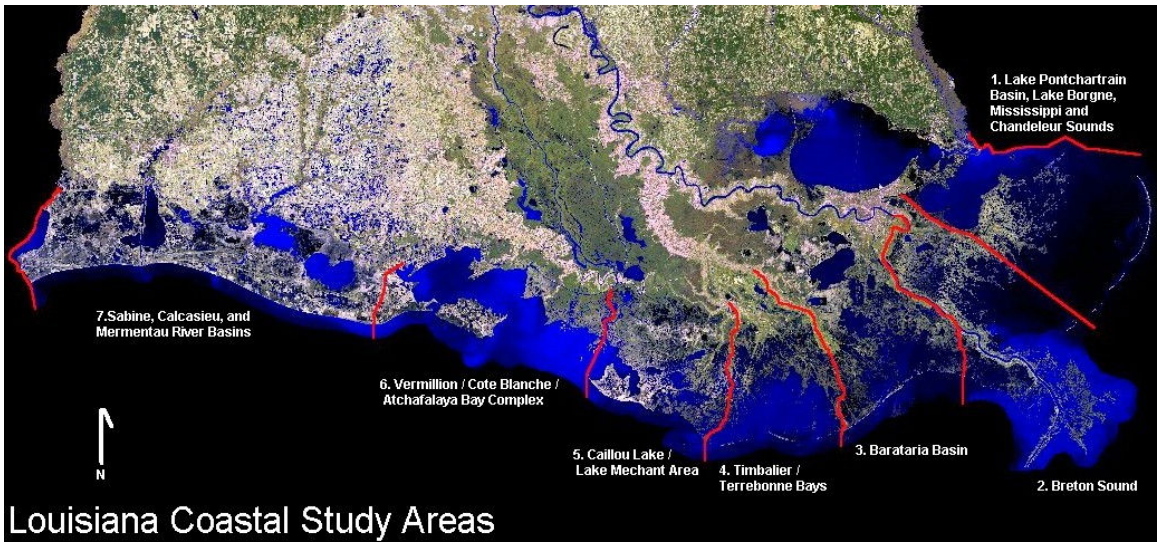

Figure 2.12. Louisiana's coastal study areas.